

The Science Behind CLIMATE



CHANGE

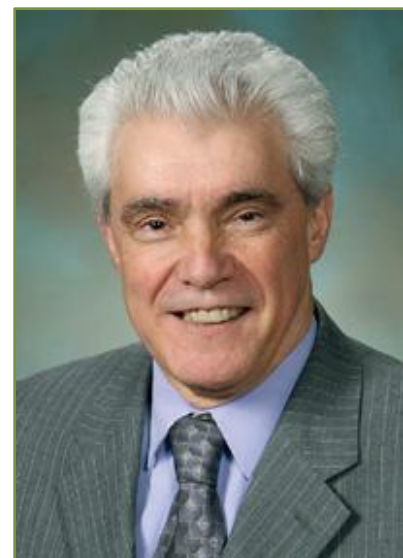
From Sen. Mike Carrell

As a former high school and community college instructor in the sciences for many years before becoming a legislator, **I have some knowledge of the science behind global “warming and cooling.”** With all the discussion this session about climate change, greenhouse gasses and CO2 emissions, I wanted to share some information with you that I’ve discovered.

I went back to the old textbooks from which I taught in 1967, and found a section on the composition of the Earth’s atmosphere. I wanted to compare that with the most recent data to see how much it has really changed in the last 50 years or so. As it turns out, it’s not a whole lot.

In the early 60’s, the atmosphere was made up of roughly 78% nitrogen, 21% oxygen, 1% argon, and the remainder was made up of CO2, neon, helium, krypton, xenon, hydrogen, and other trace amounts of various gasses. **The most recent data** shows that the atmosphere is currently made up of 78% nitrogen, 21% oxygen, 1% argon, and the amount of CO2 has increased from .033% to .034%.

Another way to put that is that if you had a hundred dollars, you’d have to cut a tiny slice out of one penny like a piece of a pie to show how much the carbon dioxide level in the Earth’s atmosphere has increased since the 1960’s.



1963 - CO2 makes up .033% of the Earth’s atmosphere,
or about 3.3 cents per \$100

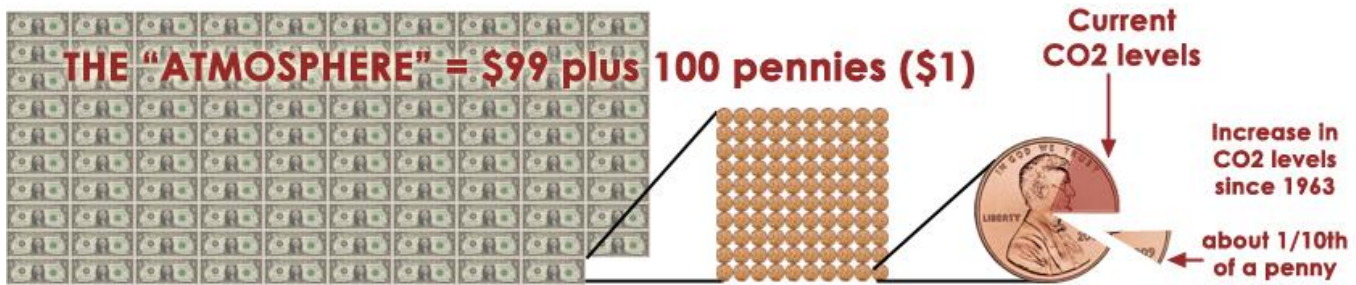


2009 - CO2 currently makes up .034% of the Earth’s atmosphere,
or about 3.4 cents per \$100



**1/10th OF A PENNY OUT OF \$100 OVER
NEARLY 50 YEARS IS A VERY SMALL AMOUNT**

The numbers that the Legislature is debating as far as statewide greenhouse gas emissions go are very small. **Just because we can measure the amount of CO2 in the atmosphere isn't necessarily a cause for alarm.**



SOURCE: The Wall Street Journal, 3/5/09

Another interesting question to think about is this: as you go back through the Earth's history, the amount of CO2 in the atmosphere fluctuates. If you compared that against global temperatures, you'd find that they fluctuate in congruence with each other. The question is, does the rise and fall of global CO2 levels cause the temperature of the Earth to rise and fall, or is it the other way around? Is CO2 the cause, or is it the effect of what we're experiencing now?

Most of the CO2 in the world isn't in the air. It's also in the lakes, rivers and oceans, and the vast majority is locked up in rock.



The relationship between temperature and how well a gas (such as CO2) stays dissolved in a liquid (such as the ocean) is called **Henry's Law**, and is best illustrated using the example of a can of soda. If your can is cold, does it release more gas when you open it than it would if it were warm? Does the amount of gas trying to escape from the can cause the temperature of the soda to change, or does the temperature of the soda cause a differing amount of gas to escape? The answer, of course, is that the amount of gas in the can has no effect on the temperature of the soda. Instead, **the temperature of the soda dictates how much gas is released when you open the can.**

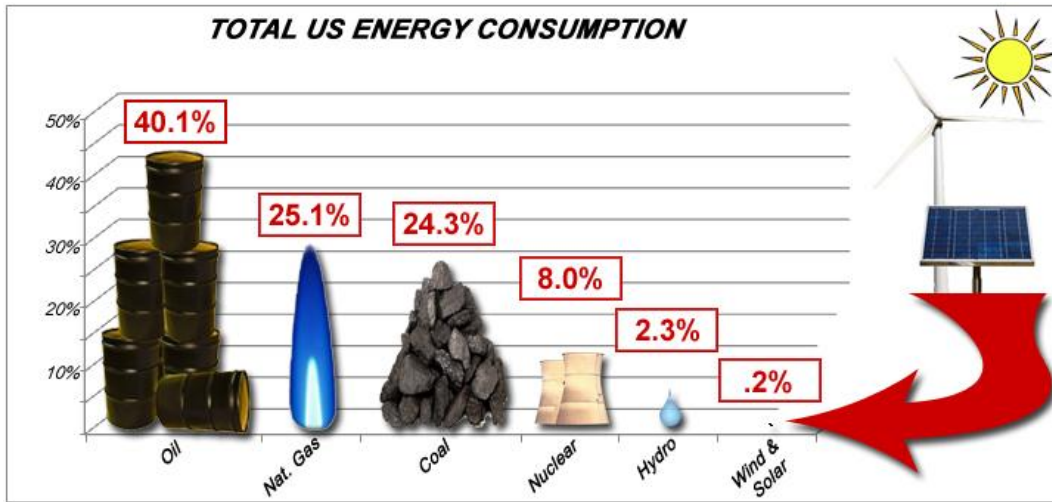
Getting real about renewable energy

There's been a lot of discussion this session about greenhouse gasses and renewable energy, and I wanted to share some facts with you. **I recently discovered some information I thought you might appreciate.**

Energy usage for the United States amounts to the equivalent of 47.4 million barrels of oil each day. Of that 47.4 million:

- 19 million barrels (40.1%) comes from oil itself.
- Natural gas comes second, as we use the equivalent of about 11.9 million barrels a day (25.1%).
- Coal places third in our energy usage at about 11.5 million (24.3%) barrels.
- Nuclear power falls a distant fourth with 3.8 million barrels (8%).
- Hydro power falls below that with 1.1 million (2.3%).





Solar and wind power, geothermal, wood waste, and other energy sources combined make up the equivalent of about .1 million barrels of oil each day, or .2%.

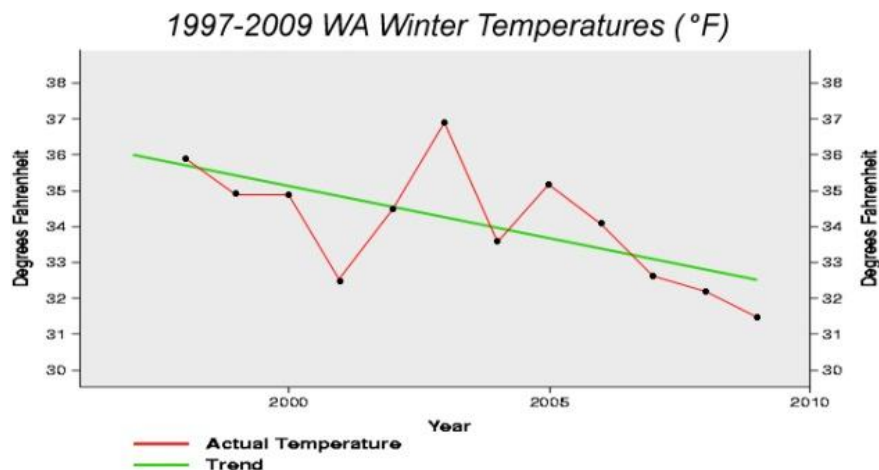
That means that if we increased the amount of alternative energy production in the United States by 500%, it would still only make up 1% of our total energy usage. Statistics like these are important to keep in mind when we're talking about energy policy and debating bills that could drastically impact our state's economic future.

State weather records show a cooling trend

I've come across some information that I'd like you to consider as we all look at the issue of global warming and climate change. This information strongly suggests some of the predictions in this area could be wrong.

In 2006, Washington State's Department of Ecology predicted that our climate will warm by .5 degrees Fahrenheit each decade over the next several decades. That is a rate of warming **three times faster** than the warming experienced during all of the 20th century.

The National Oceanic and Atmospheric Administration (NOAA) recently released data that shows Washington's winter temperatures have trended at a downward rate of 2.85 degrees Fahrenheit per decade from 1997-2009.



Forced conservation through mileage taxes

You might remember two years ago, I stood on the floor of the Senate and gave a speech on [Senate Bill 5803](#), which created a Regional Transportation Commission. That commission used transponders in private vehicles to track your trips across the Tacoma Narrows Bridge so it could charge you the toll automatically. I could see the writing on the wall and warned that the next step would be using it to charge motorists a mileage tax based on how far they travelled. I offered an [amendment](#) that would have prevented such a tax, and Sen. Ed Murray, a Seattle Democrat, didn't deny that it was a possibility. My amendment was defeated, and now...two years later...**the mileage tax idea is back.**

Oregon is considering the very same thing. In this state, everyone is being encouraged to drive less and buy fuel-efficient and electric vehicles. That results in fewer dollars coming in from gas taxes, so lawmakers here in Olympia are scrambling to find ways to increase taxes.

They're looking under every rock to find extra revenue. One example is [Senate Bill 6900](#), which went down in flames last year. That bill would have put a tax on the size of a person's engine and its emissions, and it was one of the most controversial and unpopular bills I've seen since I've been at the Legislature.

While SB 6900 is officially dead, it lives on in [SB 6309](#), which **should have been called "Son of 6900."** This law is a precursor to taxing the size of your engine. Instead of directly taxing the size of your vehicle's engine, this bill requires manufacturers to disclose how much CO2 vehicle engines produce. Why would liberals want to know how much CO2 your car produces? Big engines produce more CO2 because they have more displacement. With the passage of this bill, the next step would be to tax the amount of CO2 the engine produces.



Anti-pollution controls worked!



Cars today produce less than 2% of the hydrocarbons and carbon monoxide than they did in 1966. The increased amount of CO2 in exhaust is the result of more complete combustion in engines. Better combustion is the result of anti-pollution controls; we wanted less hydrocarbons and more CO2 being produced to lower the amount of smog-producing exhaust. We succeeded in lowering emissions of harmful chemicals, which increased relatively harmless CO2 gas.

Now environmentalists want to tax the high CO2 amounts being produced by these cleaner-running engines!

Engines are air pumps. Engine displacement is a measure of how much air is pulled into the engine and CO2 amount is a measure of how much goes out of an engine.

Perhaps I am being conspiratorial, but this appears to be a backdoor way to a new tax on engine displacement, in the name of saving the planet from “global warming.” Radical environmentalists believe you are the cause of global warming, not natural causes. For more on this subject, please see *Environment and Climate News*, Vol. 11 No. 3 (March 2008).

Are “green” cars really green?

With all of the emphasis on fuel economy and “green” this and that, I came across an article in the Legislature that suggests that a “Hummer H3 is friendlier to the environment than a Toyota Prius in its total ecological footprint.” It turns out that despite the Prius getting great mileage, many other cars are more ecologically friendly in total. This is because, in the case of the Prius, the nickel to make the batteries comes from Canada and is then shipped to Europe for refining. The nickel is then shipped to China to create “nickel foam.” This nickel foam is then shipped to Japan to make nickel metal hydride batteries. **These batteries are then placed in Prius cars to be shipped back to the North America and Europe.** Many gasoline-fueled cars get about the same mileage as a Prius, without the total environmental impact. I provided this information to give you food for thought. For the complete article, look on the Internet for the article in the *Investor’s Business Daily*, Thursday, March 22, 2007.



Classic cars can be made green too! It makes more sense environmentally to restore older cars, especially if newer, more efficient engines from salvage yards are installed, than to crush, melt down or throw away that old car or its parts. I believe the reuse of cars is another way to reduce the environmental impact of cars and to enjoy a satisfying hobby.

100% energy efficient housing?

One of the bills I spoke about on the Senate floor had to do with modifying the state’s energy independence act.

Senate Bill 5840 would, among other things, allow a utility company trying to meet its conservation targets to count the energy saved by a retail electric customer, but only if the customer has a projected overall thermal conversion efficiency of at least 70 percent. What that means is a person has to make their house 70% energy efficient or better.

Having spent my career as a science teacher, I’m familiar with the laws of nature and thermodynamics. It could be relatively easy to create a 10%-50% energy efficient home. **However, while it may be theoretically possible to create a 70% or better energy efficient home, it would cost an enormous amount of money to do so.** Let’s look at the facts:

Whenever you have thermal energy being converted from one form to another, some of that energy is lost in the form of unusable heat. The following illustrations show how this applies in the real world:



A coal generating plant is about 12% efficient.
Massive amounts of energy in the form of heat are lost during the process.



An average motor vehicle runs about 20% efficient.
That's why your car engine heats up when it's been running a while.



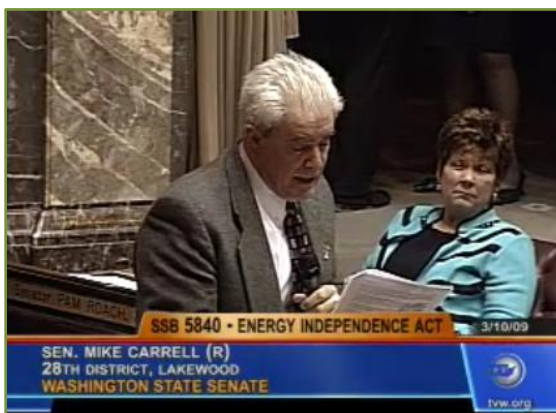
Incandescent light bulbs are about 50% efficient, as they also get hot after being on for a time.



Fluorescent light bulbs are probably one of the most energy efficient products on the market.
They run at 80%-85% efficiency, and still get warm to the touch.



Geothermal, photovoltaic (solar) cells and windmills all convert energy, but usually at lower efficiencies.



So why does the state expect homeowners to make their homes 70% efficient, especially when doing so would cost an exorbitant amount of money...something not many people have to throw around in this economic climate? I'm **surprised that the Senate chose to try and suspend the laws of nature and economics by passing [SB 5840](#)**. While the goal is noble, the practical implementation will not work.

[Click here to watch my entire floor speech.](#)

Electrical energy production and the environment

We are in one of **five major warming periods that have occurred over the last 400,000 years**. The current major warming began about 19,000 years ago. Many believe that carbon dioxide is the cause of the minor temperature upswing that began about 1890. This warming merely restores Earth temperatures that existed during the Dark Ages (after the fall of Rome). For those who are concerned about carbon dioxide's role in this, you should read on.



Burning coal creates carbon dioxide gas. In 2007, the Legislature had a bill that would have banned coal-burning to produce electrical power in this state. I spoke about the bill, saying that since we have dammed almost all usable river sites, **wind, tides and solar energy can provide little additional power**, even if completely harnessed. I said that I would vote for the bill, provided the Legislature was willing to consider nuclear power generation as an alternative. I further said that coal could be better used to make gasoline substitutes anyway, like Germany in the 1940's and today in South Africa.

Here are the facts. If all the electricity you consume during your life comes from burning coal, it would result in 68.5 tons of solid waste. The same electricity from nuclear power would be less than two pounds and would fit in a soda can. A coal-fired plant also releases more radiation (mostly radium) than a nuclear plant.

Wind, tides and solar are poor substitutes because of their low power potentials here. For example, to replace one large nuclear power station with wind generators would require 300,000 acres (500 square miles), and solar would need more than 50 square miles of photovoltaic cells. Neither would work much of the time here because of our weather conditions. All of this makes **nuclear power an attractive option** to replace burning coal to generate energy. *Environment and Climate News*, Vol. 11 No. 3 (March 2008)



A "global warming" fact...During the last 100 million years, 95 percent of that time the Earth was warmer than today.

And another...During the Age of Dinosaurs (65+ million years ago), dinosaurs roamed north of the Arctic Circle because of global warmth.

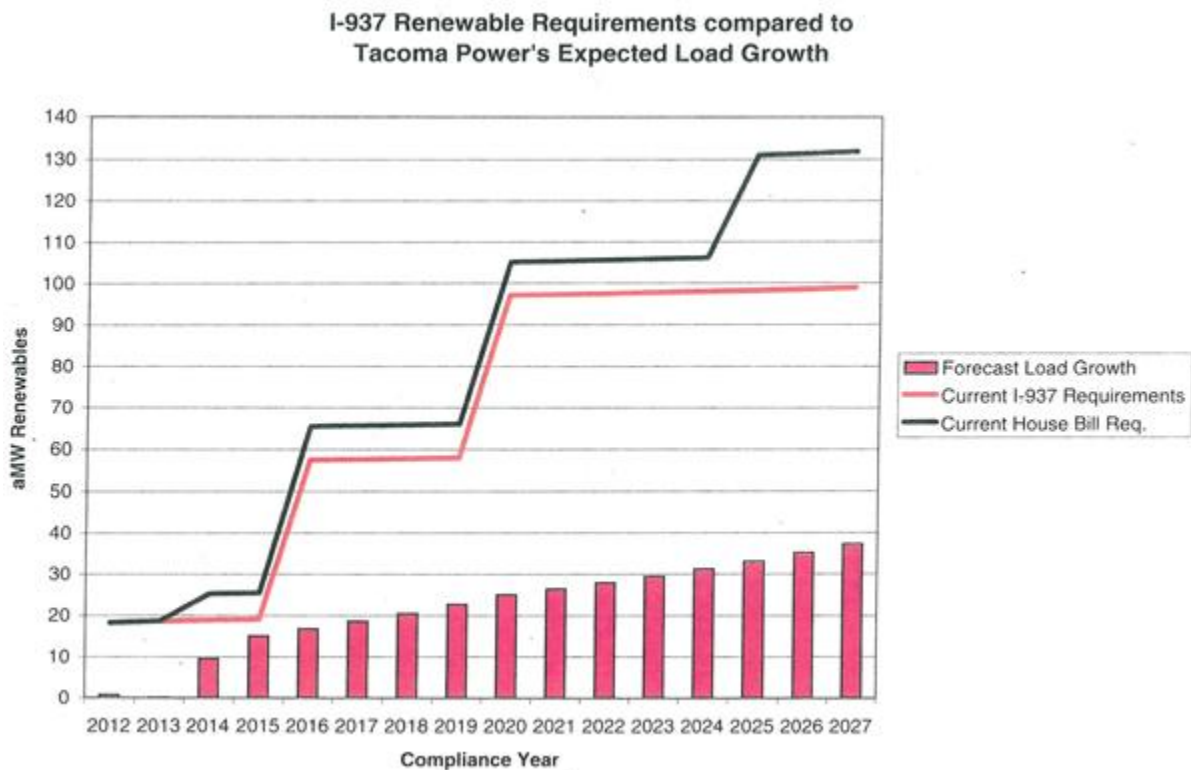


Who was burning coal and oil then before man existed?

I-937 renewable requirements

In 2006, Washington voters passed Initiative 937 by 52% to “encourage the development of clean, sustainable energies.” It requires large utilities to obtain 15% of their electricity from new renewable resources such as solar and wind by 2020 and undertake cost-effective energy conservation.

In the graph below, you can see Tacoma Power’s expected energy load over the next 20 years or so. The red line indicates how much renewable energy Tacoma power will be required to purchase for each year because of I-937’s requirements.



Look at the ever-widening gap between the amount of load growth and the required amount of renewable energy. **What do you think is going to happen when a power company is forced to purchase energy it doesn't need?** The power company is going to have to stop producing cheap hydropower in favor of the expensive renewable, which is going to raise the cost to consumers.

Under [House Bill 1009](#), which is currently being considered by the [Senate Ways and Means Committee](#), the required amount of renewable energy that utility companies would be forced to purchase would increase even more.

Using hydro power to “firm up” wind and solar

One of the biggest problems with wind and solar energy is that it's unreliable. While I'm not opposed to this kind of renewable energy, **I am concerned that mandating public utilities to get certain percentages of their power from these unreliable sources will lead to rolling blackouts, roller-coaster demand levels and skyrocketing costs to ratepayers.**



As an example, whenever a utility is adding wind generated energy into the grid, there is always the possibility that it could suddenly slow or increase as the wind does every day. That's why power companies have to back up their wind and solar power with hydropower or some other, more stable form of power.

I contacted Lakeview Light and Power, which operates a 205 megawatt wind farm, to see how much it costs them to maintain enough hydropower to compensate for any fluctuations in the output of the wind farm. According to the e-mail response I received, Lakeview Light and Power pays almost \$140,000 each month just to make sure the Bonneville Power Administration, which operates most of the dams in the state, has water at the ready. The e-mail also said that cost may well double or triple as they study the cost of stabilizing power production further. The question is who will end up footing the bill for these costs?

The greater percentage of unstable renewable energy sources the state mandates power companies use, the more likely it becomes that fluctuations in power output will need to be mediated with stable hydropower, **which translates to increased costs to you in the form of higher electric bills.**

